

What is claimed is:

1. A method for manufacturing an optical fiber preform by MCVD comprising:

5 a depositing process for forming a clad/core deposition layer on an inner wall of a quartz tube;

a collapsing process for collapsing the quartz tube on which the deposition layer is formed by heating the quartz tube at a higher temperature than a softening temperature;

10 an etching/collapsing process for etching and collapsing the quartz tube at the same time by injecting an reaction gas for etching into the quartz tube together with heating the tube at a higher temperature than a softening temperature so that the inner diameter of the tube is optimized just before a following closing process; and

15 a closing process for forming an optical fiber preform without a hollow portion by heating the quartz tube having the optimized inner diameter at a higher temperature than a softening temperature,

whereby an index dip existing at a center of the optical fiber preform core is minimized.

2. The method for manufacturing an optical fiber preform according to
20 claim 1,

wherein, in the etching/collapsing process, the reaction gas for etching is a mixture gas of an etching gas and oxygen, and a flow rate ratio of O₂ to the etching gas is 2.5 to 30.

3. The method for manufacturing an optical fiber preform according to claim 2,

wherein a flow rate of O₂ is 50 to 120 sccm, and a flow rate of the etching gas is 4 to 20 sccm.

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4. The method for manufacturing an optical fiber preform according to claim 1,

wherein, in the etching/collapsing process, a collapse rate of the quartz tube is 0.5 to 3.0mm²/min.

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5. The method for manufacturing an optical fiber preform according to claim 1,

wherein, in the etching/collapsing process, the quartz tube is collapsed to have the inner diameter within the range of 2 to 4mm.

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6. The method for manufacturing an optical fiber preform according to claim 1,

wherein the etching/collapsing process is performed from a gas input portion to a gas output portion along a longitudinal direction of the quartz tube.

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7. The method for manufacturing an optical fiber preform according to claim 1,

wherein, in the etching/collapsing process, a rotational velocity of the quartz tube is 15 to 30rpm, a movement velocity of a heat source is 1 to 40mm/min, and a

surface temperature of the tube is 2000 to 2400°C.

8. The method for manufacturing an optical fiber preform according to claim 1,

5 wherein the collapsing process is performed 1 to 4 times.

9. The method for manufacturing an optical fiber preform according to claim 1,

10 wherein, in the collapsing process, an inner pressure of the quartz tube is kept in a positive pressure of 0 to 10mmWC in order to make a multi-mode optical fiber preform.

10. The method for manufacturing an optical fiber preform according to claim 1,

15 wherein, in the collapsing process, an inner pressure of the quartz tube is kept in a negative pressure in order to make a single-mode optical fiber preform.

11. The method for manufacturing an optical fiber preform according to claim 1,

20 wherein the collapsing process is performed together with injecting O₂ or Cl₂ into the quartz tube.

12. The method for manufacturing an optical fiber preform according to claim 11,

wherein a flow rate of O₂ or Cl₂ is 1.2 to 2.4slpm.

13. The method for manufacturing an optical fiber preform according to claim 1,

5 wherein the closing process is performed from a gas output portion to a gas input portion along a longitudinal direction of the quartz tube.

14. The method for manufacturing an optical fiber preform according to claim 13,

10 wherein the closing process is performed together with injecting O₂ or Cl₂ into the quartz tube.